Number of Standards* by Common Core Domain and Grade/Course

Domains from Common Core		K	1	2	3	4	5	6	7	8	M1	M2	M3	4th
Counting and Cardinality	(CC)	7												
Number & Operations in Base Ten	(NBT)	1	6	8	3	6	7							
Number & Operations—Fractions	(NF)				3	7	7							
Ratios & Proportional Relationships	(RP)							3	3					
The Number System	(NS)							8	3	2				
Number and Quantity	(N)										3	8	2	19
Measurement & Data	(MD)	3	3	10	8	7	5							
Operations & Algebraic Thinking	(OA)	5	8	4	9	5	3							
Expressions & Equations	(EE)							9	4	8				
Algebra	(A)										13	9	16	2
Functions	(F)									5	20	12	12	9
Geometry	(G)	6	3	3	2	3	4	4	6	9	16	23	7	2
Statistics & Probability	(SP)							5	8	4	12	11	9	5

* Some standards have multiple parts

Teacher ______________________ Date(s) ______________________

Objective: ____

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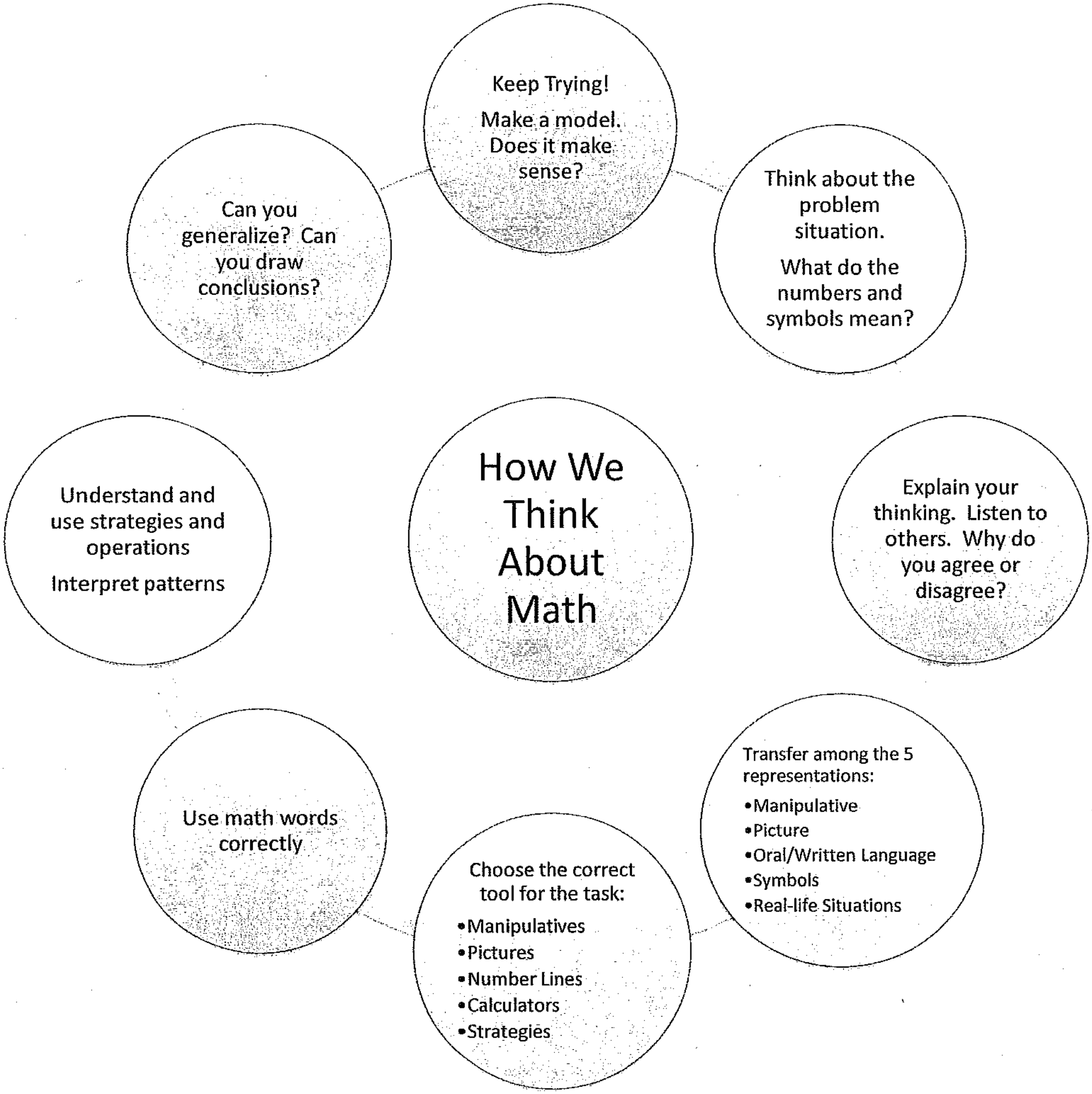
Lesson Portion	Activity and Resources	Modes of Representation
Opener o Whole Group o Small Group o Independent		o Concrete o Pictorial o Symbolic o Oral/Written Language o Real-Life Situation
"I" o Whole Group o Small Group		o Concrete o Pictorial o Symbolic o Oral/Written Language o Real-Life Situation
"We" o Whole Group o Small Group		o Concrete o Pictorial o Symbolic o Oral/Written Language o Real-Life Situation
"2" o Whole Group o Small Group		o Concrete o Pictorial o Symbolic o Oral/Written Language o Real-Life Situation
"You" o Independent		o Concrete o Pictorial o Symbolic o Oral/Written Language o Real-Life Situation
Application		
Closer o Whole Group o Small Group o Independent		o Concrete o Pictorial o Symbolic o Oral/Written Language o Real-Life Situation


How We Think About Math
Keep Trying!
Make a model. Does it make sense?
Think about the problem situation.
What do the numbers and symbols mean?
Explain your thinking. Listen to others. Why do you agree or disagree?
Transfer among the 5 representations:
•Manipulative
•Picture
•Oral/Written Language
•Symbols
•Real-life Situations
Choose the correct tool for the task:
•Manipulatives
•Pictures
•Number Lines
•Calculators
•Strategies
Use math words correctly
Understand and use strategies and operations
Interpret patterns
Can you generalize? Can you draw conclusions?

Mathematics | Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

1 Make sense of problems and persevere in solving them.
Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

2 Reason abstractly and quantitatively.
Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

3 Construct viable arguments and critique the reasoning of others.
Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions,

communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

4 Model with mathematics.
Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

5 Use appropriate tools strategically.
Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

6 Attend to precision.
Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

7 Look for and make use of structure.
Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

8 Look for and express regularity in repeated reasoning.
Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content

The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.

The Standards for Mathematical Content are a balanced combination of procedure and understanding. Expectations that begin with the word "understand" are often especially good opportunities to connect the practices to the content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, step back for an overview, or deviate from a known procedure to find a shortcut. In short, a lack of understanding effectively prevents a student from engaging in the mathematical practices.

In this respect, those content standards which set an expectation of understanding are potential "points of intersection" between the Standards for Mathematical Content and the Standards for Mathematical Practice. These points of intersection are intended to be weighted toward central and generative concepts in the school mathematics curriculum that most merit the time, resources, innovative energies, and focus necessary to qualitatively improve the curriculum, instruction, assessment, professional development, and student achievement in mathematics.

Mathematics | Kindergarten

In Kindergarten, instructional time should focus on two critical areas: (1) representing, relating, and operating on whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Kindergarten should be devoted to number than to other topics.

(1) Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as 5 + 2 = 7 and 7 – 2 = 5. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.

(2) Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders, and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

Useful CCSSM Resources

Draft K-5 Learning Progression for Counting & Cardinality & Operations & Algebraic Thinking:

http://commoncoretools.files.wordpress.com/2011/05/ccss_progression_cc_oa_k5_2011_05_302.pdf

Draft K-5 Learning Progression for Number in Base 10

http://commoncoretools.files.wordpress.com/2011/05/ccss_progression_cc_oa_k5_2011_05_302.pdf

Draft 6-8 Learning Progressions for Expressions and Equations

http://commoncoretools.files.wordpress.com/2011/04/ccss_progression_ee_2011_04_25.pdf

North Carolina Resources

www.ncpublicschools.org/acre/standards/

Ohio Resources

http://www.ode.state.oh.us/GD/Templates/Pages/ODE/ODEDetail.aspx?page=3&TopicRelationID=1704&ContentID=83475&Content=106870

Utah Resources

http://www.schools.utah.gov/core/default.aspx

California Resources

http://caccssm.cmpso.org/

Maine Resources

http://www.maine.gov/education/lres/commoncore/index.html

K-5 Math Resources

www.k-5mathteachingresources.com/

Math cats

http://www.mathcats.com/#contents

NCTM Resources

http://www.nctm.org/news/highlights.aspx?id=26084&blogid=6806

Michigan Resources

http://www.mictm.org/index.php/resources/common-core-state-standards

Common Core Mathematics Vocabulary Terms

Kindergarten		First Grade		Second Grade	
Count	Sort	Addition	Centimeter	Addition facts	Dollar
Ones	Above	Subtraction	Inch	Hundreds	Quarter (coin)
Tens	Below	Sum	Hours	Skip count	Half Dollar (coin)
Forward	Beside	Difference	Half hour	Expanded form	Cents
Zero	In front of	Group	Minutes	Standards form	Line plot
Greater than	Behind	Counting On	Digital	Number names	Picture graph
Less than	Next to	Making ten	Clock	Value	Bar graph
Equal	Square	Doubles	Trapezoid	Ruler	Angles
Addition	Circle	Combinations	Half-circle	Yardstick	Faces
Subtraction	Triangle	Equal sign	Quarter-circle	Meterstick	Quadrilaterals
Length	Rectangle	True	Cube	Measuring tape	Pentagon
Weight	Flat shape	False	Right rectangular	Foot	Hexagon
More	Solid shape	Unknown	prism	Yard	Rows
Less	Corners	Digits	Cone	Meter	Columns
Taller	Sides	Two-digit number	Cylinder	Number line	Thirds
Shorter	Penny?	Greater than sign	Half	A.M.	Halves
Longer	Dime?	Less than sign	Fourth	P.M.	
Larger		Mental math	Quarter (fraction)		
Smaller		Unit	Nickel?		

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Common Core Mathematics Vocabulary Terms

Third Grade		Fourth Grade		Fifth Grade	
Multiply	Fraction bar	Estimation	Table	Parentheses	
Product	Numerator	Factor pairs	Line plot	Brackets	
Divide	Denominator	Multiples	Angle	Braces	
Quotient	Elapsed time	Prime	Ray	Numerical expression	
Remainder	Open number line	Composite	Endpoint	Evaluate	
Array	Gram	Sequence	Degrees	Ordered pairs	
Unknown	Kilogram	Area model	Protractor	Coordinate plane	
Equal shares	Liter	Equation	Points	Powers of 10	
Factor	Scale (of graph)	Equivalent fractions	Lines	Decimal point	
Variable	Unit square	Mixed number	Line segments	Thousandths	
Pattern	Area	Improper fraction	Right angle	Volume	
Even	Perimeter	Decimal	Acute angle	Origin	
Odd	Rhombus	Hundredths	Obtuse angle	x-coordinate	
Round	Quadrilaterals	Tenths	Perpendicular lines	y-coordinate	
Unit fraction	Formula	Pound	Parallel lines	x-axis	
Equivalent		Ounce	Right triangle	y-axis	
Whole number		Conversion	Line of symmetry	formula	

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Common Core Mathematics Vocabulary Terms

Sixth Grade		Seventh Grade		Eighth Grade	
Ratio	Coefficient	Proportion	Vertical angles	Terminating decimal	Reflection
Unit rate	Order of operations	Simple Interest	Adjacent angles	Repeating decimal	Translation
Tape diagram	Substitution	Tax	Surface area	Irrational number	Congruent
Double number line diagram	Dependent variable	Markup	Sample population	Integer exponent	Dilation
Percent	Independent variable	Markdown	Random sampling	Square root	Similar figures
Greatest Common Factor	Nets	Percent of increase	Variability	Cube root	Transversal
Least Common Multiple	Median	Percent of decrease	Probability	Radical	Corresponding angles
Distributive Property	Mode	Gratuities	Frequency	Scientific notation	Interior
Integer	Range	Commissions	Simple event	Slope	Exterior
Positive Number	Mean	Percent error	Compound events	y-intercept	Pythagorean theorem
Negative Number	Dot plot	Additive inverse	Tree diagram	slope-intercept form	Cone volume formula
Opposite	Histogram	Multiplicative inverse	Simulation	linear equation	Cylinder volume formula
Zero pair	Box plot	Scale drawing		like terms	Sphere volume formula
Absolute value	Interquartile range	Plane sections		simultaneous linear equations	Scatter plot
Inequality	Mean absolute deviation	Circumference		function	Outlier
Exponents		Supplementary angles		input	Positive association
Term		Complementary angles		output	Negative association
				non-linear functions	Line of best fit
				rate of change	Bivariate measurement data
				rotation	

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Common Core Mathematics Vocabulary Terms

High School Number and Quantity	High School Algebra	High School Functions	
Rational exponent	Complete the square	Domain	Exponential function
Complex number	Maximum	Range	Logarithmic function
Conjugate	Minimum	Function notation	Trigonometric function
Moduli	Exponential function	Fibonacci sequence	Period
Imaginary number	Geometric series	Recursive process	Midline
Real number	Remainder Theorem	Intercepts	Amplitude
Rectangular form	Binomial Theorem	Increasing intervals	Exponential growth
Polar form	Pascal's Triangle	Decreasing intervals	Exponential decay
Quadratic equation	Logarithmic Function	Positive intervals	Constant function
Polynomial		Negative intervals	Arithmetic sequence
Fundamental theorem of Algebra		Relative maximum	Geometric sequence
Vector		Relative minimum	Invertible function
Initial point		Symmetries	Radian measure
Terminal point		End behavior	Arc
Velocity		Periodicity	Sine
Parallelogram rule		Rate of change	Cosine
Scalar multiplication		Step function	Tangent
Matrices		Absolute value function	
Zero matrix		Asymptote	
Identity matrix			
Determinant			

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Common Core Mathematics Vocabulary Terms

High School Geometry		High School Statistics and Probability	
Angle	Angle	Dot plot	Margin of effort
Circle	Circle	Histogram	Simulation models
Perpendicular lines	Perpendicular lines	Box plot	Subsets
Parallel lines	Parallel lines	Interquartile range	Unions
Line segments	Line segments	Standard deviation	Intersections
Point	Point	Outlier	Complements
Line	Line	Frequency table	Independent
Arc	Arc	Relative frequency	Conditional probability
Rigid motion	Rigid motion	Joint relative frequency	2-way frequency table
Congruent	Congruent	Marginal relative frequency	Addition Rule
Angle-Side-Angle	Angle-Side-Angle	Conditional relative frequency	Multiplication Rule
(ASA)	(ASA)	Residuals	Permutations
Side-Angle-Side (ASA)	Side-Angle-Side (ASA)	Correlation	Combinations
Side-Side-Side (SSS)	Side-Side-Side (SSS)	Causation	Theoretical probability
Inscribed	Inscribed	Correlation coefficient	
Scale factor	Scale factor	Sample survey	
Dilation	Dilation	Experiment	
AA similarity	AA similarity	Observational studies	
Theorem	Theorem		
Law of Sines	Law of Sines		
Law of Cosines	Law of Cosines		

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